



# FIRST AID LEVEL 2

## SECTION 13: ENVIRONMENTAL EMERGENCIES

### **Exit Outcomes**

*At the end of this section you will be able to:*

- *Name the effects of wind on a drowned casualty.*
- *Explain the difference between Heat Exhaustion and Heat Stroke.*
- *Describe the first aid treatment for a snake bite with cytotoxic venom.*

### **13.1 TEMPERATURE RELATED EMERGENCIES**

#### **13.1.1 Cold Related Emergencies**

Cold related emergencies may involve only part of the body or the whole body. A cold injury to part of the body is called frostbite. Cold injury to the whole body is called low body temperature, (hypothermia). To prevent cold related emergencies, make sure children wear appropriate clothing in cold weather and don't stay outside in very cold weather.

#### **Low Body Temperature (Hypothermia)**


Hypothermia occurs when the core body temperature falls below 35.5°C and is a serious condition that can cause death. A child can develop hypothermia even when the air temperature is above freezing for example when swimming in cold water. Under normal conditions, the body copes well with exposure to cold or heat. However, when the difference in temperature between the cold environment and the normal body temperature is too great, heat loss exceeds heat production. This causes the thermo-regulating mechanism in the brain to fail, and the body core cools down. E.g. when in water that is 20°C and below.



**Wind Chill** It is important to understand the effect wind has on the body temperature. The body cools itself by several methods including radiation, respiration, evaporation, condensation and convection. The colder the air temperature is, the greater the heat loss from the body. The body warms a thin layer of air around it and if this layer is blown away, a higher rate of heat loss occurs and the body feels colder quicker.



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Signs and symptoms of Hypothermia	First Aid Treatment for hypothermia
The skin is cool to the touch.	HHHH CPR. Get the casualty out of the cold
Violent shivering.	Remove wet clothing, pat dry.
Shivering stops once core temperature falls below 33°C Centigrade.	Put on dry clothes if available and wrap in a blanket.
Confusion, change in personality, unconcerned about their condition.	Phone your emergency response number 10177/112 and retrieve the first aid kit.
Muscles become stiff and rigid. Skin feels ice cold and is blue in colour.	Put blankets or towels under and around the casualty, cover the head but not the face.
Unconsciousness	HHHH CPR, cover with a blanket
Signs of frostbite	First Aid Treatment for frostbite
	<p>Signs and symptoms of frostbite include: white waxy skin, oedema, blisters and swelling.</p> <p><b>NB First aid for frostbite:</b> Do not rub frostbitten area. Warm slowly. Seek medical help!</p>

## 13.1.2 Heat Related Emergencies (Hyperthermia)

Prevent heat related emergencies; avoid being over-exposed to high temperatures outdoors. Do not leave young children alone in a parked car, ensure sufficient fluids are drunk during hot weather. Children are especially sensitive to extreme temperatures.

Many of the signs of a heat related emergency are similar to those of the “flu”. Serious heat related emergencies include **Heat Exhaustion (Hyperthermia)** due to dehydration, resulting from excessive loss of electrolytes and water from severe perspiration/sweating. If untreated **Heat Stroke** develops where the brain fails to function due to massive vasodilatation and failure of the protective temperature regulating mechanisms in the brain.

Signs and symptoms of Heat Exhaustion	First Aid Treatment
Muscle cramps	HHHH CPR. Move the casualty to a cool or shady area.
Perspiration/sweating	Loosen or remove tight clothing.
Headache	Encourage the casualty to drink water/rehydrate if they can sit up and swallow.
Nausea	Sponge or spray the casualty with cool (not ice-cold) water. “Fanning” also assists in bringing the body temperature down.



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Signs and symptoms of Heat Stroke	First Aid Treatment
Weakness and Dizziness	Continue to cool the casualty until their behaviour is normal again or trained help takes over.
Confusion or strange behaviour	HHHH CPR. Move the casualty to a cool or shady area. Loosen or remove excess clothing.
Vomiting	Do not give anything to drink as cannot swallow properly.
Red, hot and dry skin	Sponge or spray the casualty with cool (not ice-cold) water. "Fanning" also assists in bringing the body temperature down. Continue to cool the casualty until their behaviour is normal again or trained help arrives and takes over.
Shallow breathing, seizures or no response	If the casualty stops responding, start CPR.

## 13.2 ANIMAL AND HUMAN BITES

Bite injuries can be divided into those that affect the skin and soft tissue (i.e. dog, cat, and human bites), and those where venom or poison is injected (i.e. spider, snake, and marine creatures). Human bites should be reported to the Police Services as an assault.



All animal bites have the possibility of carrying the **rabies** virus. Any animal displaying abnormal behaviour must be reported to the Police Services and local SPCA, as follows:

- a tame animal becoming vicious
- a wild animal becoming tame
- an animal frothing at the mouth

A tell-tale sign of a human infected with the rabies virus is an extreme or irrational fear of water (hydrophobia).

- ✘ **Rabies** is a viral infection of the central nervous system.
- ✘ Incubation can last anywhere between 10 days to 12 months.
- ✘ Death can occur within 4-5 days.
- ✘ There is a vaccine available.

All animal bites carry the risk of carrying the bacterial disease called **tetanus**. An anti-tetanus booster vaccine is recommended every five years. When in doubt, have the casualty visit the nearest medical facility.

### First Aid Treatment for Animal and Human Bites

1. HHHH CPR.
2. Calm and reassure the casualty.
3. Wash hands well before and after to prevent contamination; wear gloves.
4. Wash wound with running water for five minutes.
5. If bite area is bleeding apply direct pressure and elevate the limb.



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## 13.3 INSECT BITES AND STINGS

### Wasps and Bee's

A sting from a flying insect usually causes a painful sensation and red swelling lasting less than 24 hours. The only danger is if there are multiple stings and a large amount of venom is injected. This can cause toxic reactions such as fever, vomiting and kidney malfunction. Casualties who are allergic to these types of stings will have a more severe reaction (Anaphylactic Shock, refer to Section 8).

### Spiders

There are over 2500 species in Southern Africa, but only around 20 are medically important in respect of the traumatic symptoms that will require medical treatment if bitten.

**Cytotoxic:** tissue destroying venom.

Examples: Sac spiders (commonly found indoors), and Violin spiders (found mostly outdoors).

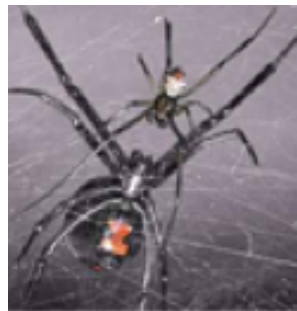
**Neurotoxic:** venom affecting the nervous system

Examples: Black and brown button.

*Sac Spider*



*Violin spider bite at 4 weeks*



*Brown Button Spider*



*Violin Spider*

**Scorpions:** Stings mostly cause severe local pain and sensitivity to touch, heat and cold. But some stings can cause muscle pains or spasms, a general sense of weakness, convulsions and coma. Scorpions with thick tails and thin pinchers are highly venomous (**neurotoxic**) and life-threatening.



*Highly Venomous Scorpion*



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Tick bite with black infected centre

**Tick bites:** Usually occur when involved in outdoor activities and can lead to Tick bite fever. The tick head must be removed with tweezers and the area cleaned. Symptoms of tick bite fever (a bacterial infection transmitted by ticks) include fever, headache, weakness and skin rash.

## First aid treatment for insect bites and stings

1. HHHH CPR.
2. If possible, establish if the casualty is allergic to the wasp or bee venom. If so, they probably carry a medical device for injecting epinephrine (adrenaline). Have the casualty administer their medication immediately.
3. Keep the casualty calm as movement will spread the venom through the body.
4. Wash the bite site with soap and water.
5. Remove rings, watches and constricting items/clothes on or near affected area as the affected area may swell up causing additional pain.
6. In the case of a bee sting, scrap away the stinger (tail) with a sharp-edged object (e.g. a flat knife or credit card), so as not to squeeze more venom into the casualty.
7. Cover the area with an ice pack or clean moist dressing to reduce the swelling.
8. Observe the casualty for any signs of a severe allergic reaction.
9. Phone for emergency assistance.

South African Vaccine Producers (Pty) Ltd: (011) 386 6000

Poison Information Helpline: **0861 555 777** (24 hours)

## Interesting facts about bees, wasps and spiders

- If the queen bee dies, workers will create a new queen by selecting a young larva (the newly hatched baby insects) and feeding it a special food called “**royal jelly**”. This enables the larva to develop into a fertile queen.
- The average worker bee lives for just five to six weeks. During this time, she’ll produce around a twelfth of a teaspoon of honey.
- Wasps can sting again and again, unlike a bee that dies when it leaves it’s sting in its victim.
- Wasps feed their young meat e.g. insect larvae.

## 13.4 SNAKE BITES

There are about 175 species of snakes in Southern Africa, of which only 15 are considered dangerously venomous.

### Neurotoxic

Venom affecting the nervous system.

**Examples:** Berg Adder, Cape Cobra, Snouted Cobra, Forest Cobra, Rinkhals, Black Mamba and Green Mamba.

**Symptoms:** tingling at the bite site, weakness, drooping of eyelids, difficulty in speaking and respiratory arrest. Onset of action is 2-6 hours.

Berg Adder (Neurotoxic Venom)





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## Haemotoxic

Venom has an anti-coagulant effect on the blood system.

**Examples:** Boomslang and Vine snake/Twig snake.

**Symptoms:** bleeding from the bite site, open wounds, bleeding from the nose, lungs, kidneys and stomach. Onset of action is slow over several days.



*Southern Vine Snake (Haemotoxic Venom)*

## Cytotoxic

Venom attacks cells causing damage to tissue cells.

**Examples:** Gaboon Adder, Puff Adder, Black Spitting Cobra and the Mozambique Spitting Cobra.

**Symptoms:** pain, redness and swelling around the bite site, small blisters, ulcers and may result in a slow healing ulcer and gangrene the and may result in loss of limb function. Onset of action is 10-30 minutes.



Mozambique spitting cobra (Cytotoxic Venom)

## Interesting facts about snakes

- There are between 6 500 to 10 000 recorded snake bites in South Africa every year, resulting in about 10-50 human deaths per year.
- Over 75% of snake bites are “Dry bites”. The snake uses its venom to catch food and generally gives a warning first before striking as humans do not form part of their diet.
- The human eye cannot see the amount of venom needed from Boomslang to prove fatal.
- In South Africa, any snake longer than 2m, other than a rock python, is venomous.

## General Signs and Symptoms of a Snake Bite

Conscious Casualty	Unconscious Casualty
May experience numbness, general sense of weakness from the shock.	Bleeding from puncture site, nose, and mouth, as well as in the urine.
Blurred vision	Swelling.
Fever and nausea.	Skin discolouration.
Excessive sweating.	Difficulty in breathing.
Dizziness and fainting.	Rapid pulse.
Loss of muscle co-ordination, convulsions.	Look for puncture marks in the skin.
Increased thirst.	Look for signs of shock.



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Regard all snake bites as a medical emergency and transport the casualty to a medical facility as quickly as possible. The administration of the right anti-venom could save a life. Due to their small body mass, children are at a higher risk of severe complications or death.

## First Aid Treatment for Snake Bites

1. HHHHCPR. Transport to a medical facility as soon as possible.
2. Reassure the casualty.
3. Restrict movement as exertion will cause the venom to circulate quicker through the body.
4. Monitor casualty's pulse, breathing and level of consciousness.
5. Treat for shock.
6. Remove rings, watches if bite on hand or arm as limb may swell.
7. If the snake can be identified as a **neurotoxic** specimen, a broad pressure bandage can be applied covering the entire limb. Use the same pressure as though strapping a sprained ankle.
8. Phone Tygerberg Poison Centre **0861 555 777** (24 hours) for more information on treatment.

All snake bites result in shock. Most are not fatal. Most venomous snakes if threatened will warn the culprit with "dry bites". Even the most medically important snakes, like the Black Mamba, will usually "bite" with a closed mouth as a warning.

## Hospital treatment

The casualty may need to receive a three-week course of daily, anti-venom injections if bitten by a snake. Anti-venom is cultured from horse's blood after they are given a dose of the venom, thus it can cause Anaphylactic shock. It has a shelf life of two months.

For more information on Snake bites and Anti-Venom contact **Mike Perry** at 083 448 8854. Mike supplies the anti-venom used in hospitals and is an expert in all snake related issues.

**End of Section 13.**